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Chapter

Lessons from the World Sustainable Housing (Past Experiences, Current Trends, and Future Strategies)

Amjad Almusaed and Asaad Almssad

Abstract

The term vernacular architecture is widely accepted by architects and derives from the Latin "VERNACULUS", which means "domestic, native, indigenous", local. So vernacular architecture designates the entire culture built from a particular place. In modern housing design, the inheritance and development of traditional architectural culture is reflected in the inheritance of classic architectural forms and craftsmanship and the rational application of traditional building systems. With the progress of social civilization and the improvement of technological level, various innovative building systems emerge in an endless stream and are widely used in modern housing design. In today's rapid social and economic development, housing changes are coming quickly, sometimes even seeming a bit rough. At present, more attention is paid to the construction of new residential areas. As far as the field of urban architecture is concerned, the human settlement environment can be understood explicitly as people's living and living environment. Today architects need to design a settlement that balances all social functions between meeting current needs and future development, designing energy and material-saving buildings, so that it is in harmony with the environment, and is conducive to the physical and mental health of the human body. In other words, the planning process requires attention to human behavior, psychology, emotions, and interpersonal relationships.

Keywords: Sustainable housing, human settlement, vernacular architecture, housing strategy

1. Introduction

A house represents one of the primary material conditions of human existence. It is created to protect people from the effects of unfavorable meteorological factors (cold, heat, wind, atmospheric precipitation) and take care of leisure, work, and living needs [1]. The human settlement perspective must outline a precise vision for sustainable human settlements "everyone enjoys adequate housing, a healthy and safe environment, basic services, and productive and freely chosen work." Sustainable development is essential to the development of human settlements [2]. It must include the following two aspects:

- Everyone must have a suitable house; It refers to an appropriate place where individuals are not disturbed; appropriate space; proper security; legal guarantees during the land use period; proper lighting, heating, and ventilation; right infrastructure such as water supply, sanitation, and garbage management facilities; good quality of the environment and health-related factors.

- Residential areas must be supported by the relevant infrastructure and services; It refers to "safe water supply, environmental sanitation, waste management, social welfare, mass transportation and communication facilities, energy, health and emergency services, schools and public safety, and green space management, etc. Adequate essential services are one of the critical factors for housing [3].

"Sustainable Human Settlements in an Urbanization Process" and "Sustainable Human Settlements in an Appropriate Housing" (Sustainable Human Settlements in an Urbanizing World, Adequate Shelter for All) [4]. In the transformation, renewal, reconstruction and new construction of public housing, excessive savings and blindly lowering the cost of Inside once occupied a dominant position. This tendency appeared in the 1950s and 1970s of the former Soviet Union in the late 1970s and Sweden to end the housing shortage once and for all, the Swedish parliament decided that a million new dwellings should be built in the period 1965 to 1974 and this was achieved [5]. Many suggestions for blindly pursuing cost reduction It needs attention. That affected on the essential quality of housing and hit households with insufficient spending power particularly hard.

In recent years, sustainability as a concept in housing has taken on an increasingly prominent role. This role is made clear in all layers of housing components, from the ministerial to the institutions and to the individual consultant, contractor, and manufacturer [6]. As the concept in the sustainable housing context is still relatively new, the discipline of designing sustainable housing is correspondingly new. In the past, in many contexts, there have been similarities between efficient housing and sustainable housing [7].

The term "quality of life" is often used by city planners to reflect all aspects of the physical environment that are closely related to the productivity, satisfaction, and happiness of residents. Improving residents' quality of life is essential for regions to meet the needs of existing residents and attract and retain new businesses, employees, and other talents [8]. Cities are critical to people. Those who live, work or visit them, and those who depend on the growth that cities generate for both the city and the surrounding area [9]. However, the realities of each country form a specific local perception of what social housing means. The solution is not always offered in the form of a physical structure, sometimes more favorable conditions can be created for having a home. At the same time, in most parts of the world, the term is directly related to a problem called the affordable housing crisis. In our reality, most people are facing a "housing problem" [10]. In the modern world, housing is the most significant asset most individuals or families will ever have. Given the scale of this global problem, when the study debates social housing, it required to understand the housing stock, which will be protected by the layers of price regulation, property security, quality, and stability policies. Environmental sustainability, which helps reduce utility costs, is not the only aspect of sustainability that should be considered in such projects. The housing types are conditioned by the level of development of the country's productive forces, social relations, forms of family life, cultural and household traditions, and geographical environment. In recent years, the term "social housing" has become popular. Many texts, projects, programs have been produced under the name of this idea.

2. Reading in the world vernacular houses (visions, conception, implementation, and operation)

In architecture, "vernacular" is the term used to refer to famous constructions, made by people whose main activity is not necessarily in the field of construction [11]. It is based on empirical knowledge of materials, gained over time, through repeated trials (and failures). Knowledge is passed down from generation to generation, orally. Today, when the need for authenticity is so great, the word "traditional" seems worn out and abused [12]. It is increasingly difficult to distinguish between authentic and inauthentic. If for food there is a clear definition of what is and what is not traditional, things are not as clear and regulated in the case of architecture. The rural environment is full of boarding houses that call themselves traditional but have nothing to do with the architecture of the place [13].

An architect will say that the traditional is related to vernacular architecture - that is, the place itself. It has been developed and passed down from generation to generation, which does not mean that it has not evolved over time [14]. On the contrary, the traditional architecture has developed and refined, adapting to the times and needs, but permanently reflecting the environmental, cultural, technological, economic, and historical conditions of the local context. Although the phrases of vernacular architecture, and traditional architecture are considered synonymous, there are differences in nuance between them [15]. While vernacular architecture is created without the contribution of construction professionals, ie without architects, vernacular architecture can use craftsmen specialized in the construction process (but not architects) and is also based on local techniques and materials [16]. Traditional architecture denotes, first, the mode of transmission, from generation to generation and orally, but this is a valuable feature in the case of the first two forms.

2.1 Experience of housing in India

Houses in India are rooted in its history, culture, and religion. Tamil Nadu: The traditional architecture of South India is sometimes considered synonymous with the Agrahara-style of Tamil Nadu. The traditional house of Tamil Nadu Agrahara or Agraham reflects the primary Hindu roots of the state [17]. The Brahmins' home is considered a perfect example of this architecture. The name itself derives from the way it was placed in a village, which was like a garland. It is included in the houses leading to the primary temple of the village which are either dedicated to one deity or to different gods.

Mohenjo-Daro, city is the best-preserved and most extensive city, estimated to have had a population of 40,000. Mohenjo-Daro has a planned layout with rectilinear buildings arranged on a grid plan [18]. ln contrast to both Mesopotamia and Egypt, the Indus settlements seem to have been relatively egalitarian societies. There are neither palaces nor royal tombs, and no great temple complexes to indicate a concentration of power and wealth (**Figure 1**) [19].

Buildings were durable, being constructed of fired bricks of uniform size throughout the region, and houses were provided with underground drains connected to a well planned sewer system (see **Figure 2**) [20]. The houses organized around intern al courtyards that were open to the sky for light and air.

The plans vary, but all houses presented virtually complete facades to the street. Most were built of fired and mortared brick, some combined sun-dried mudbrick, and wooden structures [21]. While the buildings do not seem elegant in terms of architectural refinement, the clear urban layout, careful provision of a water supply [22]. Rooms were small, perhaps because there was a scarcity of wood to serve as beams for second floors and roof framing (**Figure 3**).

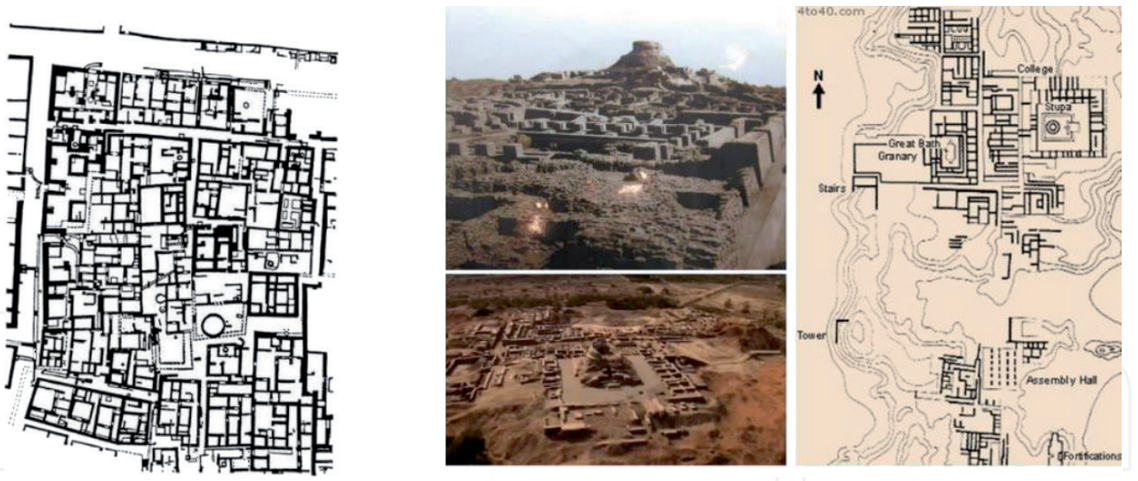


Figure 1.
Mohenjo-Daro city.

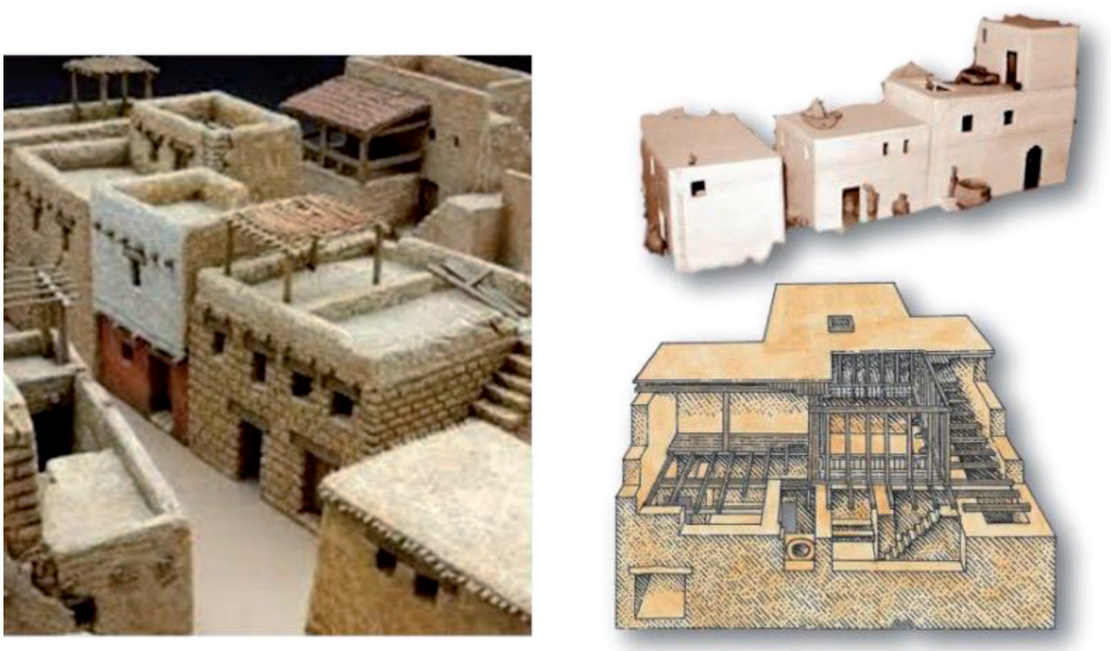


Figure 2.
A traditional house from Mohenjo Daro city.

Ancient cultures in Greece, Ancient Egypt, Babylonia, Japan, and India had all similar lists, sometimes referring in local languages to "air" as "wind" and the fifth element as "void" the classification of the material world, these five are earth, water, fire, wind/air, and void. These came from Indian Vastu shastra philosophy and Buddhist beliefs. The system of "five great elements", of Hinduism are Bhūmi – earth, Ap – water, Tejas – fire, Pavan - air or wind, Shunya (space or zero) void.

2.2 Experience of housing in China

Chinese dwellings are folk dwellings designed and built by residents with a certain degree of representativeness and rich local characteristics [23]. Among the houses in China, the most characteristic residences include Beijing courtyard houses, cave dwellings on the Loess Plateau in Northwest China, ancient dwellings in Anhui, Hakka earth buildings in Fujian and Guangdong, and Mongolian yurts [24]. The Hakka Weilong House, Beijing's "siheyuan", Shaanxi's "cave dwelling",

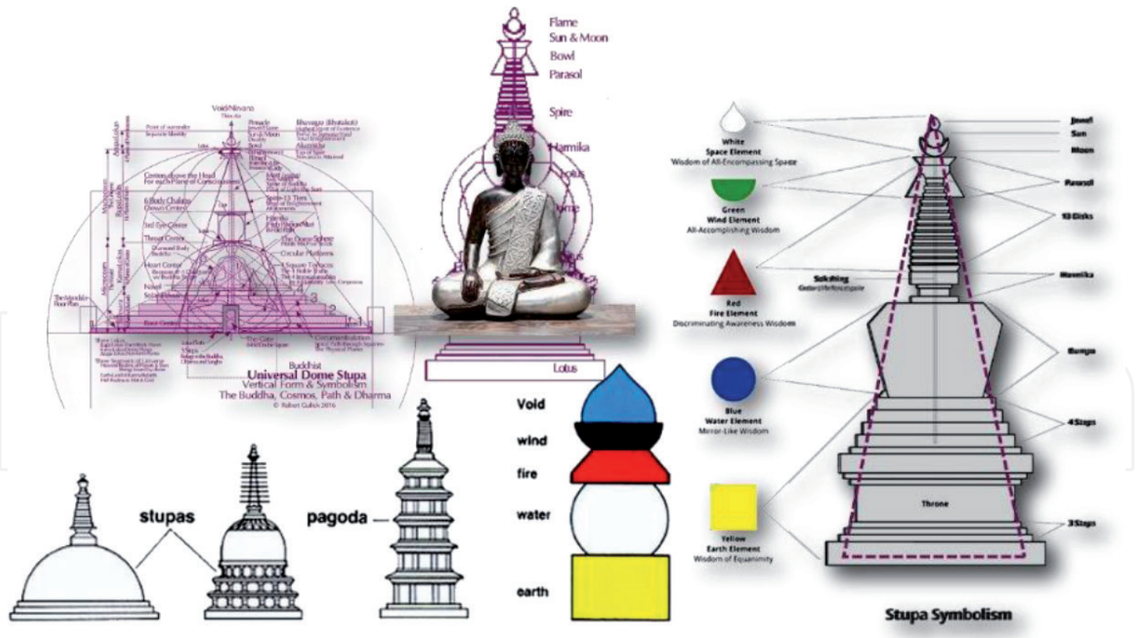


Figure 3.
Semiotics in Indian traditional building.

Guangxi's "bar-style" and Yunnan's "one seal", are collectively referred to as the five most rural traditional residential architectural forms in China [25]. It is called one of the five major characteristics of China's residential architecture in the field of architecture.

Houses in China reflects the most essential and representative things in the ethnic area in historical practice, especially the characteristics closely related to the life and production methods, customs, and esthetic concepts of the people of all ethnic groups [26]. Typical Chinese houses used "JIAN" – a structured bay as a standard unit to construct all buildings. The "Jian" represents the basic unit for wooden construction. "JIAN" was a rectangular space marked by adjacent structural frame. A modular unit called the Jian (about 3 m - 4.5 m) was defined as the primary measure in construction. "Jian", as the primary interior unit, can be expanded or repeated along the architectural plan axis to join to create a hall, then a building [27]. For example, two rows of four columns make three "JIAN". The "JIAN" is like room, in that it is a restricted space, but various a room, a "JIAN" does not necessarily have walls on all sides. Most dwellings are three to five "JIAN" in size. See **Figure 4**.

One of the great religious beliefs that influenced the design of the classical Chinese city and Chinese architecture is Confucianism [28]. To create a stable social order. Confucianism established the strict principles putting the society in order with rules and filial piety.

The experience of the nation mainly refers to the experience of how the residential houses meet the needs of life and production and the struggle against the natural environment under the social conditions at the time [29, 30]. For example, the experience of combining the use of the terrain, the experience of adapting to the climate, the experience of using local materials, and the experience of adapting to the environment. And so on, this is what is commonly referred to as the experience of adapting measures to local conditions and adapting to materials. The folk houses are distributed all over the country [31]. Due to the differences in national historical traditions, living customs, humanistic conditions, and esthetic concepts, as well as the different natural conditions and geographical environments of various places, the plane layout, structural methods, modeling, and detailed characteristics of traditional houses are also different. Different, showing simplicity and nature,

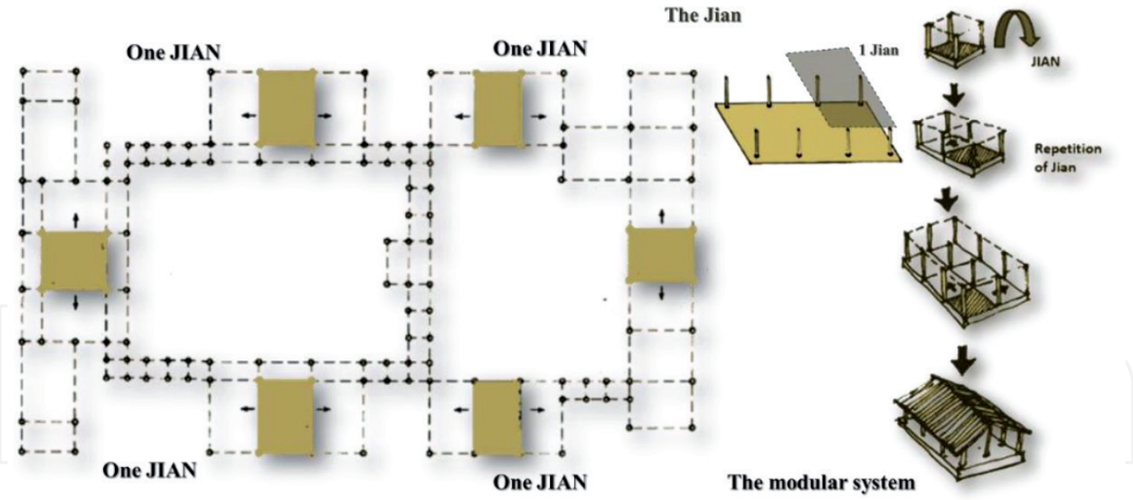


Figure 4.
The diagram of a typical Chinese house configuration.

but with their own characteristics. Especially in residential buildings, people of all ethnic groups often reflect their wishes, beliefs, and esthetic concepts, and use natural or symbolic methods to reflect their wishes, beliefs, and esthetic ideas to the decoration, patterns, colors and styles of residential buildings. Wait for the structure to go. Such as cranes, deer, bats, magpies, plums, bamboo, lilies, Ganoderma, Wanzi pattern, Hui pattern of Han nationality, lotus of Yunnan Bai nationality, elephant, peacock, betel nut tree pattern of Dai nationality, etc. In this way, the dwellings of various ethnic groups in multiple regions show a colorful and colorful ethnic characteristic. The mainstream of traditional houses in the various areas of China is the structured houses, which is represented by the "BEIJING SIHEYUAN", which adopts a symmetrical layout in the central axis [32]. The "BEIJING SIHEYUAN" is divided into two courtyards. The main house system in the center is the most respected. It is a place for family etiquette and meeting distinguished guests. Each building faces the courtyard and is connected by a verandah. Although "BEIJING SIHEYUAN" is a concrete manifestation of Chinese feudal society's patriarchal concept and family system in residential buildings, the courtyard is expansive, suitable in scale, quiet, friendly, and well-organized, making it an ideal outdoor living space. Residential houses in North China and Northeast China are mostly such spacious courtyards [33]. A SIHEYUAN is a historical type of residence that was commonly found in Beijing and rural Shanxi. The SIHEYUAN composition was the basic pattern used for homes, palaces, temples, monasteries, family businesses, and government offices (**Figure 5**).

Residential buildings do not have a set of procedural rules and practices like official buildings. They can build houses according to local natural conditions, their own economic level, and the characteristics of building materials [34].

2.3 Experience of housing in Japan

Houses in Japan have a short lifespan, so even if they are remodeled, they are structurally strong and will not get tired of the design, which can be inherited by the second and third generations [35]. The floor plan can be flexibly changed according to changes in the family structure and lifestyle of the residents. Barrier-free so that you can live with peace of mind even as you grow older. By devising the color and finish of the outer wall and roof, the appearance is unified and continuous in a group of housing complexes, or the traditional landscape that is transmitted to the land is preserved and conveyed. When building, it protects the

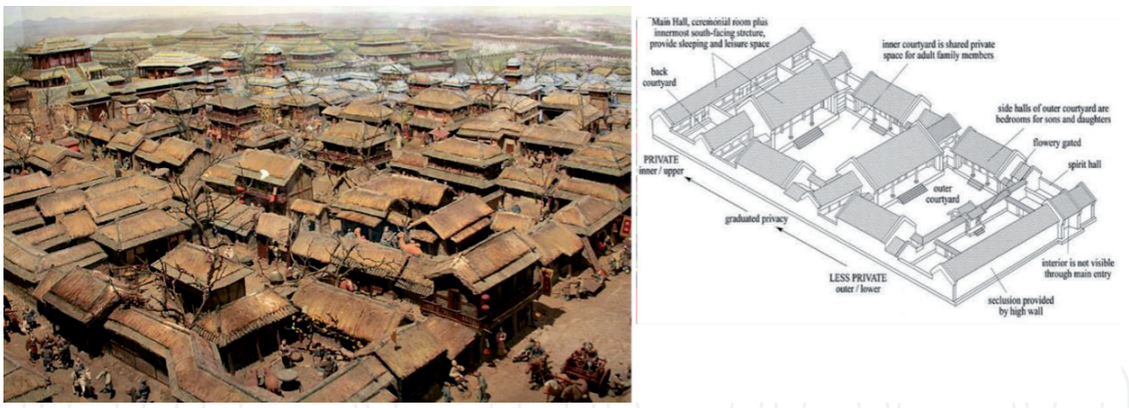


Figure 5.
The "BEIJING SIHEYUAN" house (courtyard house).

environment by minimizing the impact on the surrounding natural environment. The houses in Japan have been influenced by the climate. They were derived from China but maintained its own unique characteristics of lightness as fragility. The "KEN" is a traditional Japanese unit of length, equal to six Japanese feet "SHAKU", and equal to 1.8 m. 'KEN' is known as standard measurement of inter spaces [36] (see **Figure 6**).

Using materials produced in the land or in Japan, designing on the premise of living longer, making the structure easy to repair, remodeling, partial demolition, etc., and using the same material repeatedly will enrich the local industry. In addition, production, consumption, and waste material disposal can be circulated in the area. There are many types of house roofs, IRIMOYA, KIRIZUMA, YASEMUNÈ, and HOGYO as shown in **Figure 7** [37].

In traditional city forming many architectural elements, represent an essential symbol in city configurations and composition [38], for example, A torii is a traditional Japanese gate most found at the entrance of or within a Shinto monument, where it symbolically marks the transition from the normal to the sacred (see **Figure 8**) [39].

A vital house form and composition in architecture from Japan. Yoshimura House is one of the traditional houses located in Saga Prefecture. It was constructed in 1620 [40]. This house was used to be the prosperous farmer because it has bigger musts and beams to make this house substantial and significant, see **Figure 9**.

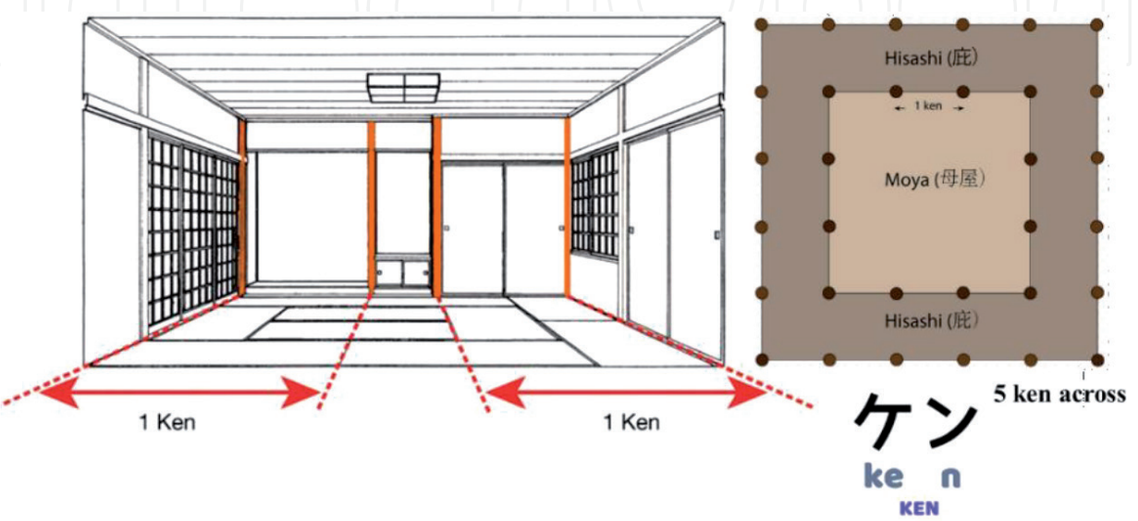


Figure 6.
"KEN" in Japan standards measurement.

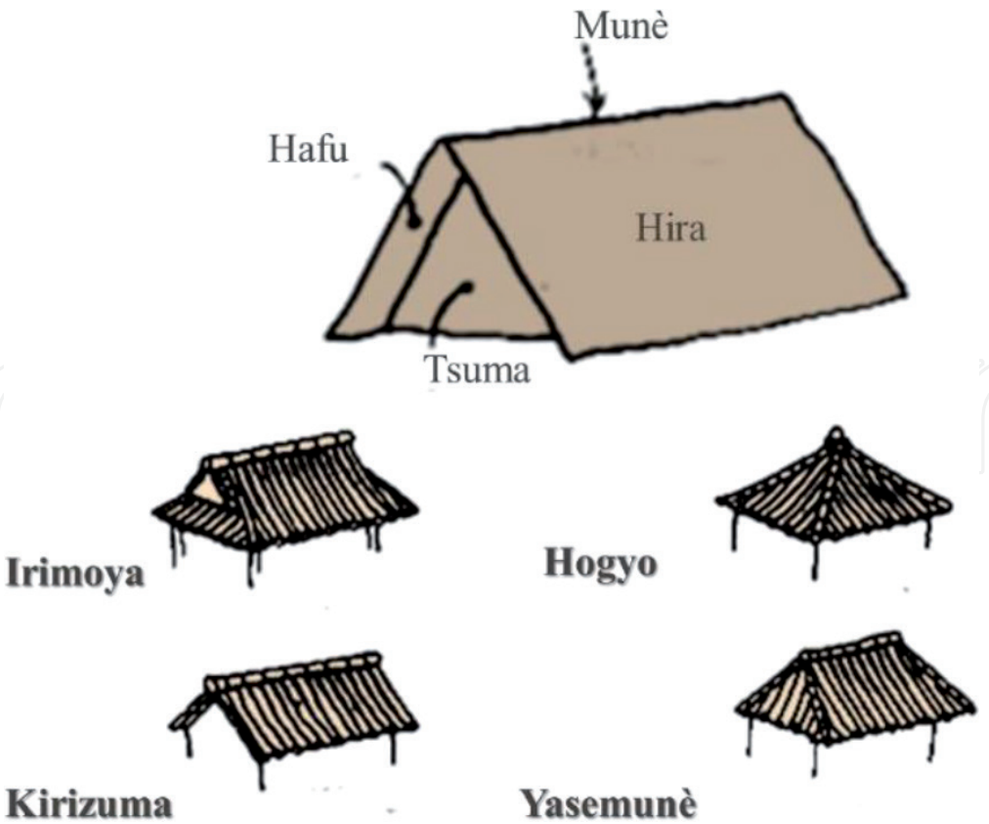


Figure 7.
Japan roof types in traditional houses.



Figure 8.
Torii in traditional Japan city elements symbols.

A Palace – mansion was a house style from the Heian period, which was a very similar to the Western European's Italian Renaissance, for this was a time for art and poetry to flourish in Japan. A "SHINDEN-ZUKURI" was an architectural style house that flourished during the Heian period [41] (see **Figure 10**).

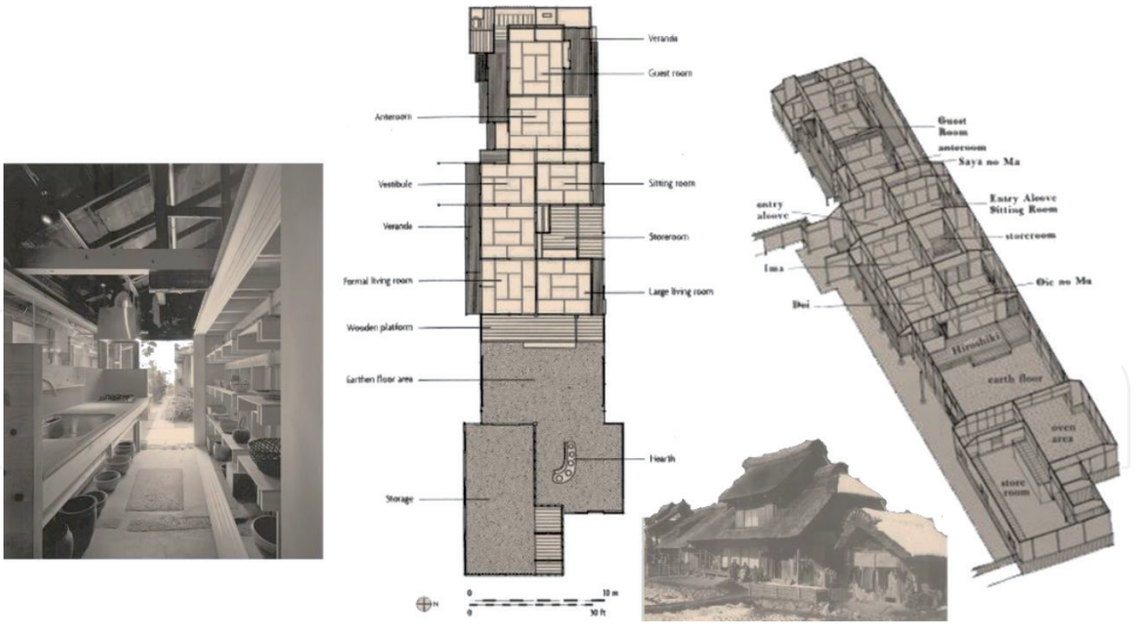


Figure 9.
"YUSHIMURA" house near Osaka – 1620.

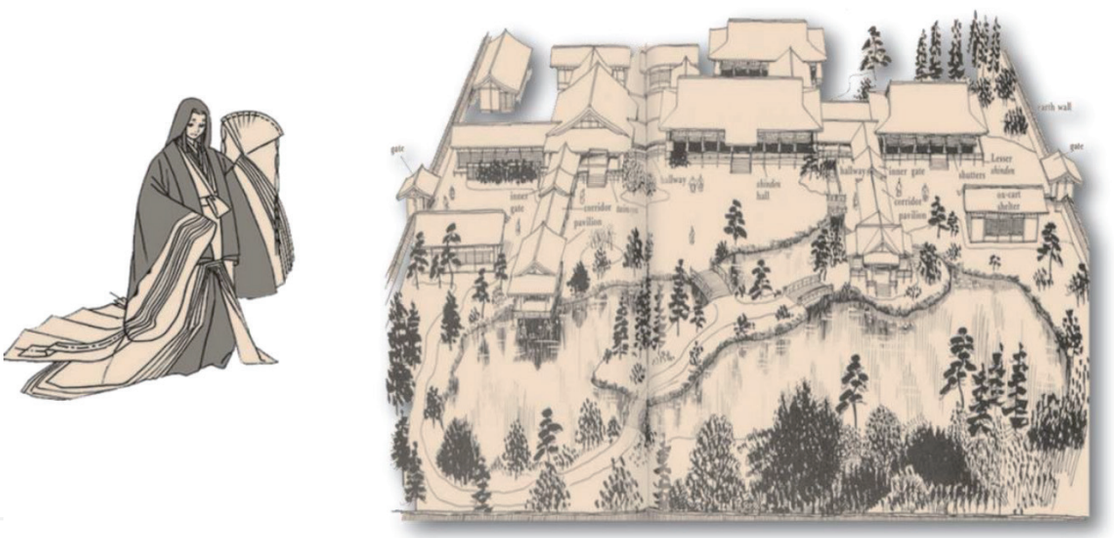


Figure 10.
A layout of a "HEIAN MANSION".

2.4 Experience of housing in Korea "HANOK"

A "HANOK" is a traditional house using traditional Korean architecture. It is a traditional house of the Joseon Dynasty that reflects the ideal of building with the mountain facing the back and facing the water in the south. It is a traditional house of the "JOSEON DYNASTY".The origin of "HANOK" is a hut in the early Neolithic period around 6,000 BC, and it is considered that traditional "HANOK" was completed in the late Joseon period [42]. During this period, the ondol, floor, and kitchen, which are the basic units of space composition, were wholly combined to form a close relationship with each yard, and "HANOK" was differentiated into various regional types.

It has various characteristics that have been developed according to the environment of the Korean Peninsula and the traditional food, clothing, and shelter patterns of Koreans, and although the wooden structure tiled house in the photos is

often thought of, thatched houses made of rice straw and ocher also fall within the scope of "HANOK". In modern Korea, the number has decreased due to Western-style buildings, but it continues to exist through the construction of temples. There is a theory that the word "HANOK" itself was derived from the opening of the door in the late Han Dynasty and modernization after liberation and the rapid spread of 'western-style houses', which is a contrasting meaning to traditional houses called 'HANOK' [43]. From a foreigner's point of view, it refers to a house in which the Koreans living on the Korean Peninsula live (see **Figure 11**). Originally, "HANOK" itself was a form of residence, so today, it was called "JUJU" and "JETAEK" as if it were just a house. It would have been divided into tile-tiled houses and thatched-roof houses as if they were divided into houses. The essential materials are the window and square that connect the front and rear columns in a straight line, the beam that connects the front and rear columns back and forth, and the rafters and the ribs that support them. When you think of "HANOK". that you can see often, you think of a "HANOK" house with an octagonal roof.

2.5 Experience of housing in Iraq

Houses in Iraq were, compact with interior courtyard. The streets are sinuous and pass-through building volumes. In the meantime, between yard and street at least a wall or a building is constantly interrupted (see **Figure 12**) [44]. This isolation from the road indicates concerns for defense. The architectural elements are intensely decorated, reproducing typologies and traditional houses [45].

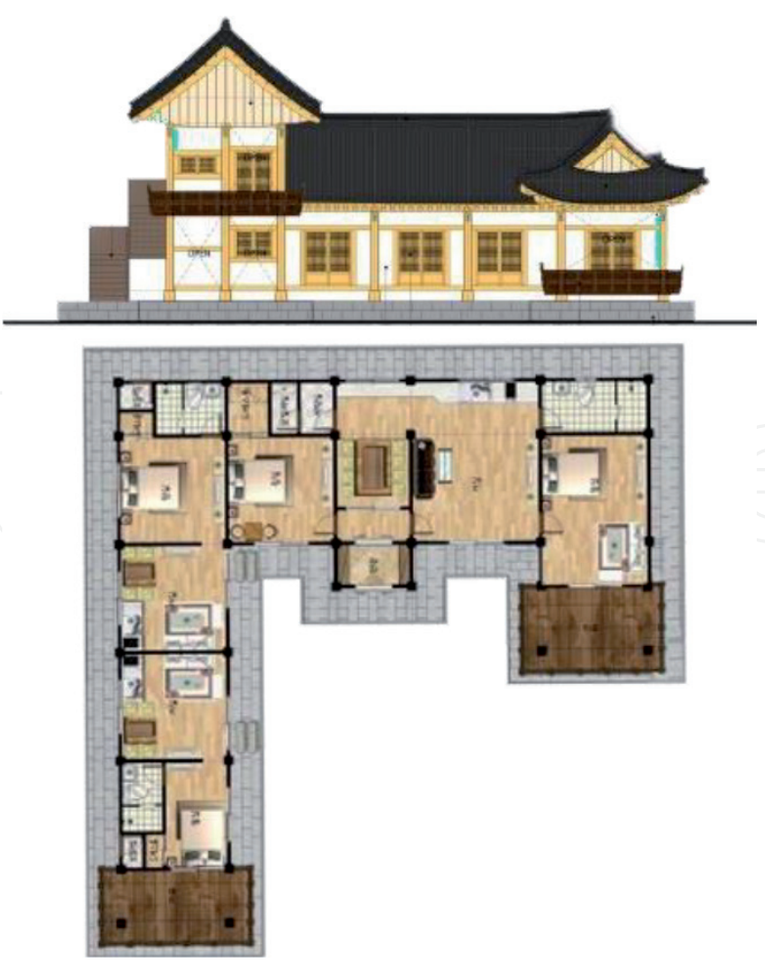


Figure 11.
An example of "HANOK" house in Korea.

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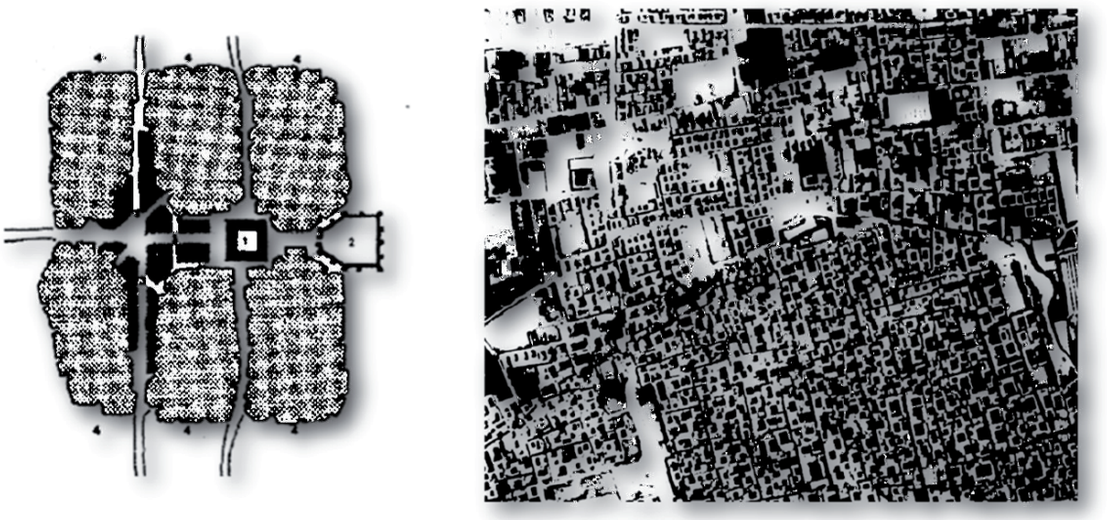


Figure 12.
A specific urban texture.

The patio is for the traditional dwelling the outside space that creates a microclimate and the most efficient form of using the inside space [46]. The shady interior courtyard has the effect that the rooms do not communicate directly with the overheated air outside, but through intermediate buffer spaces. The windows are small sized, located in the upper part and wooden framed (**Figure 13**).

"SHANASHIL" is a wooden decorative element piece or made from tiny wooden fragments allowing the inside [47]. ventilation and lighting and preventing the penetration of the outside excessive heat because wood. The thermal role of those elements is also a reflection of the sunlight and changing the current of air direction (**Figure 14**) [48].

Outside decoration are profiled elements of large volumes under various forms play the role of creating pronounced shadows on the sun-warmed facades [47]. Ventilation gaps, this element is opening located at the upper part of the houses, which is decorated with a grid network under the form of a drilled screen wall and used for ventilation and lighting [47, 48].

2.6 Experience of housing in Turkey, Iran, Central Asia

In this region a part of the old Islamic civilization developed, in which the architecture of the residential buildings is distinguished by the ingenious way in which it offers protection against excessive horses. Although the predominant type of housing is the one with an inner courtyard, an inner courtyard closed on all sides, either with buildings or with high walls. Here several variants coexist. The streets and buildings that border them form an organic unit, with the aim of thermal protection. There are different specific spaces with a thermal role. TAKURE, the area of Iran and Central Asia, RAWAQUL SHURFA, etc. [49]. All these spaces being enriched with interior and exterior decorations. The windows are replaced with sanasil, so that the partitions on the ground floor and first floor are permanently cooled by the shadow left by them Courtyards are the center of the plans of houses in south turkey. Courtyard houses, which represent the cultural layers of the Middle East, also characterize the traditional dwellings in some neighboring countries, such as Syria, Iraq, and Iran (see **Figure 15**). However, it is impossible to separate this plan type from the Anatolian cultural layers, like house plans [50].

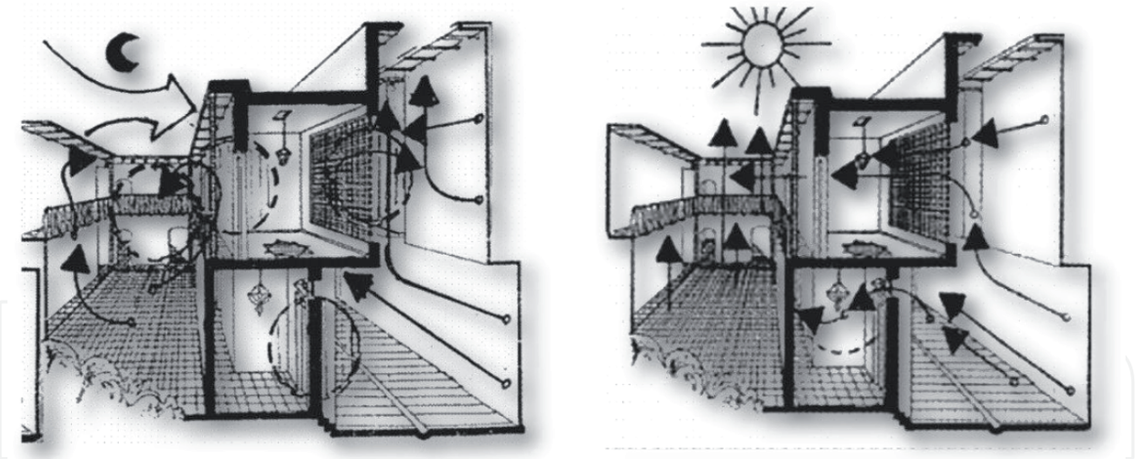


Figure 13.
A traditional Iraqi dwelling [46].

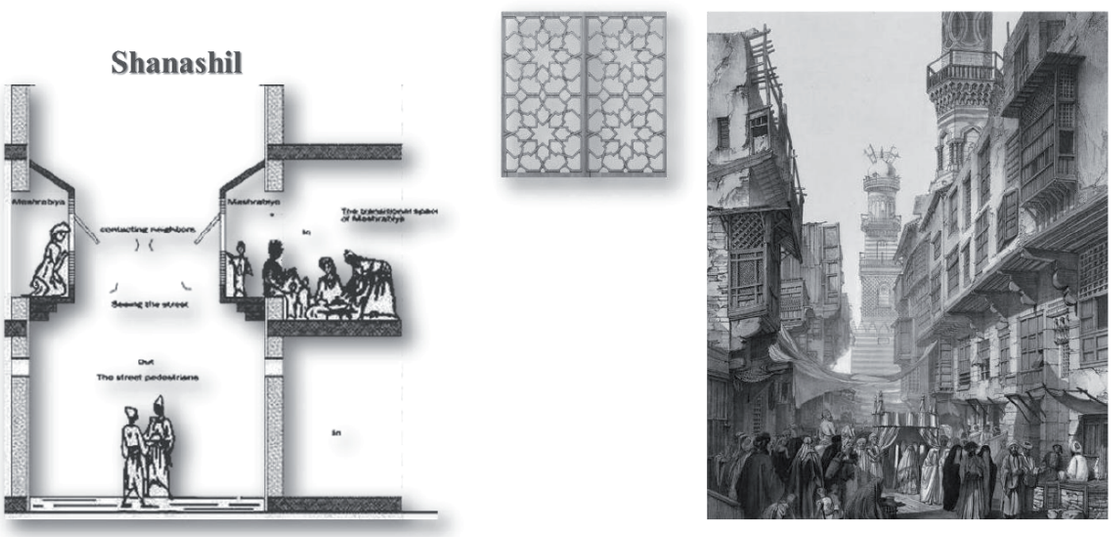


Figure 14.
The "SHANASHIL" in traditional Iraqi dwelling.

2.7 Experience of housing in Mexico

Houses in Mexico have currently been influenced by various styles, from the traditional pre-Columbian style, with its intense colors, rough textures, and thick walls, to functional modern architecture with simple straight lines. Land and housing are part of one thing [51]. The traditional vernacular dwelling becomes one more element of the same territory. The houses were made of wood and marl, the roofs were made of reeds, although the pyramids, temples and palaces were generally made of stone. The homes have a dwelling function, a cellar, and a stable, which are separated by thick structural walls and few openings (see **Figure 16**). Inside the divisions are few, some wall to isolate the kitchen, which sometimes moves towards the corridor in the simplest homes.

Most of the Mexican house style is inspired by the old famous Spanish architecture of the 18th and 19th centuries, better known as "Mission" or "Colonial" style houses, where the typical stone or white walls stucco, with red-tiled roofs and triangular ceilings but low, since it does not rain, or with small vaults. Plants, especially *aloe vera* and the like, in addition to cacti or those that need little water, usually populate the garden [52, 53].

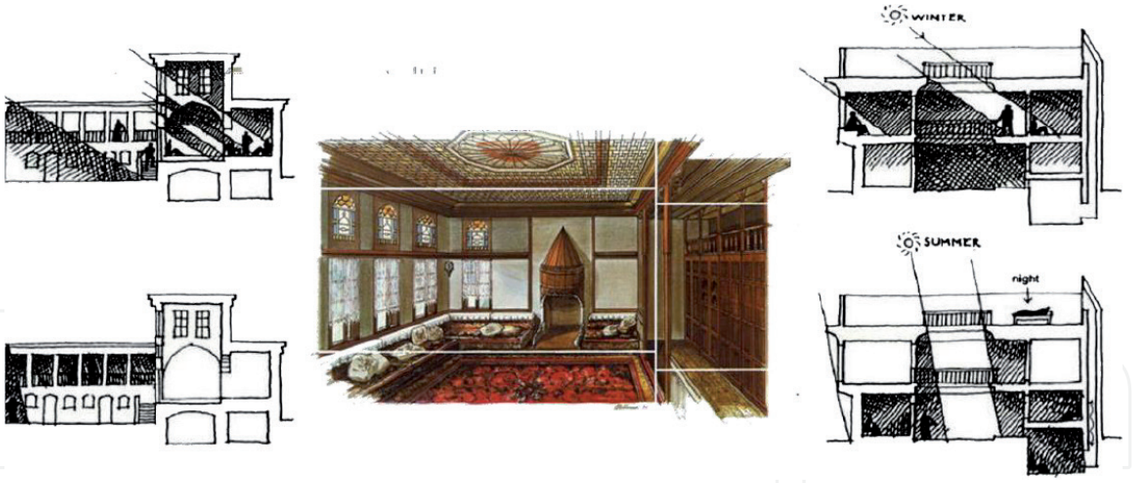


Figure 15.
The house types from Iran, Syria, and Central Asia.



Figure 16.
Different traditional Mexican houses.

2.8 Experience of housing in in Morocco, Tunisia, Libya, and North Africa

Rooms in houses from this area are not communicate directly with the overheated air from outside, but through a buffer space. At the same time, between the yard and the street there is at least one wall, or a building, often with several cores [54]. This isolation from the road indicates defense concerns (see **Figure 17**).

The cities of North Africa are compact with inner courtyards, winding streets between the built volumes. In this way the surrounding streets have the role of a cold air reserve and similarly the air in the inner courtyard will replace the air in the surrounding spaces [55]. This phenomenon occurs in the following cases:

- The surrounding streets are narrow, planted and mostly shaded with irregular profiles.

- In the shaded and chained inner courtyards, a colder microclimate is created compared to the surrounding areas from the same perimeter. This fact determines a reciprocal conditioning between the type of traditional construction and its neighborhoods on the one hand and the inner courtyard and the spaces that surround it on the other.

2.9 Experience of housing in Balkan

Houses in Balkan has been traditionally labeled either an "Ottoman house" or a "Balkan house." The focus here is on constructing national interpretations of the vernacular residential architecture in question, meaning symbolic appropriations or "nationalizations" of a shared cultural heritage from the Ottoman era 8 see **Figure 18**).

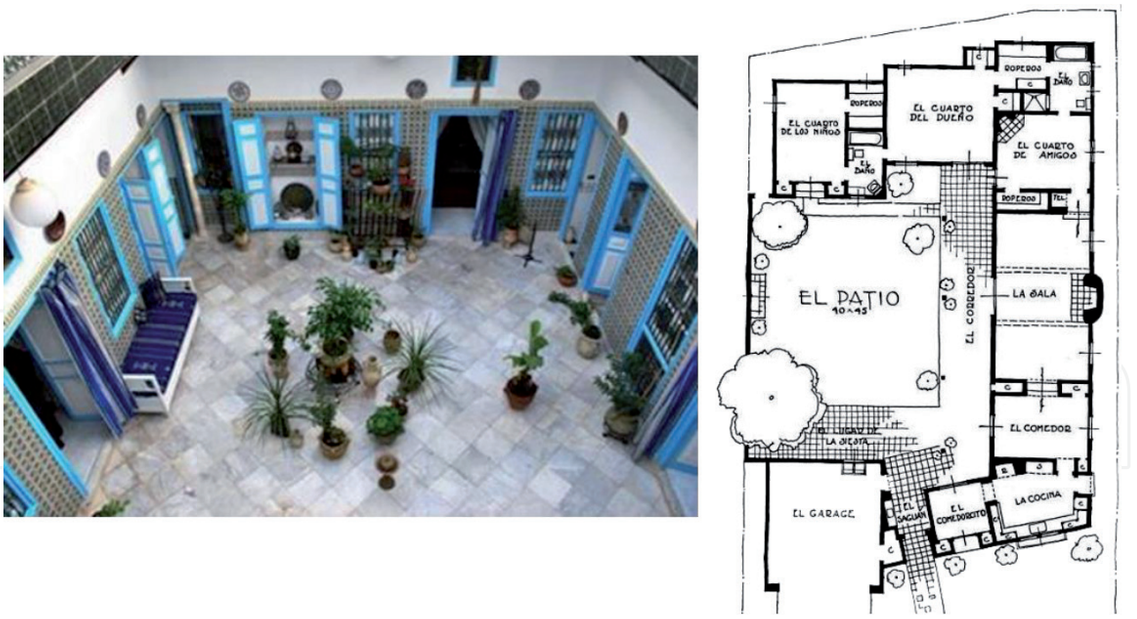


Figure 17.
Typical house from the north of Africa.

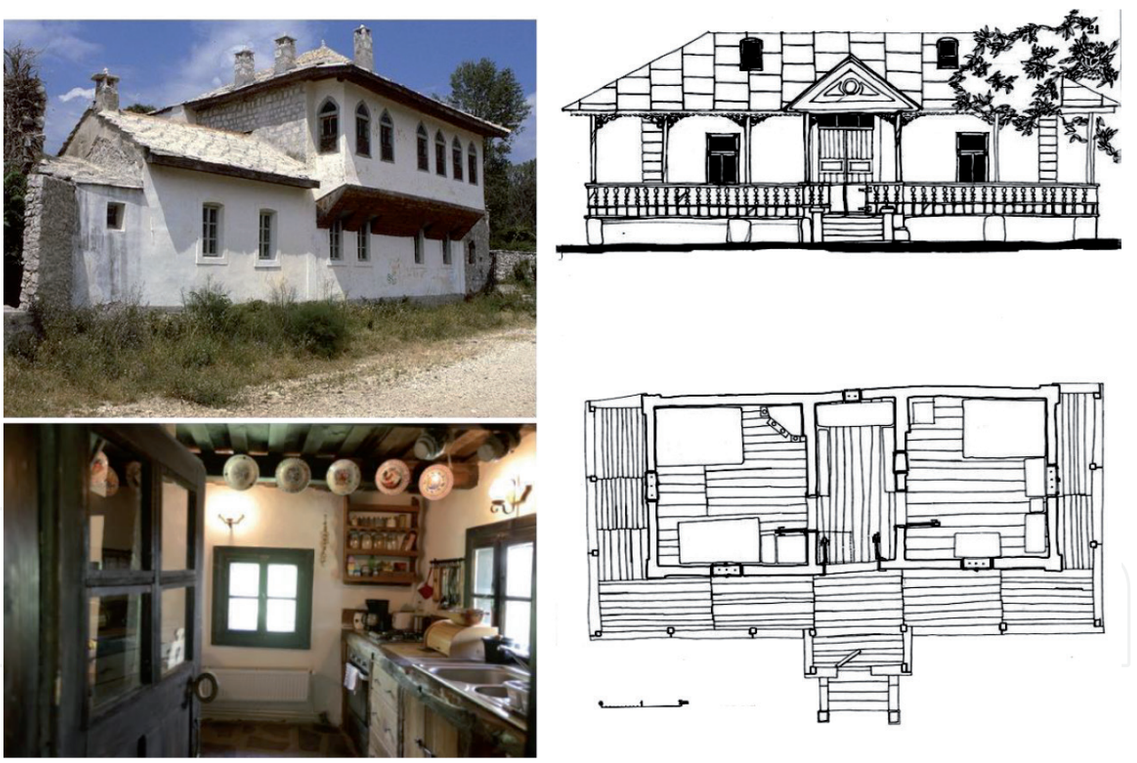


Figure 18.
The characteristic houses in Balkan.

Although dedicated to a particular form of traditional architecture, this text does not present the outcome of research in the field of art/architectural history or ethnography [56]. The house area dominates by simplicity and modesty, functional and natural elements, fabrics made with care and attention to detail, and solid furniture made to last. Each component of the traditional houses is justified by the owner's lifestyle, by the traditions he respects, and by the relationship with nature.

The traditional Balconies house is not unitary but differs depending on the area. Specialists classify these as distinct ethnographic areas. Among the most critical

ethnographic regions, which have preserved mainly their local specificity today. In other areas, traditional architecture can only be found in the village museums. Even if these areas have a distinct character of their own, there are still some common features. The peasant houses had few rooms, and the oldest were single rooms. The house usually consisted of a porch, a space, and a pantry. The access to the house was made through the porch, after which one entered the hall, and from the hall one entered the room. The porch, sometimes called porch or porch, is the open and covered space that mediates the interior-exterior relationship and is also the most ornate area of the house. The decorative elements usually covered the porch pillars, also called slippers or forks; their role was both esthetic and magical, protecting the home from evil. The porch was not just a passageway but sometimes served as a place to store snacks or household utensils. At other times, there was a hearth in the hall and thus, this space became the kitchen and living room of the house. Most of the time, however, the room was the place where the hearth was and the place where it was cooked, eaten, and slept. This is not accidental, because the fire was also used to prepare food and heat the building.

Therefore, the oldest houses had a single room, also called "house". In the summer, on hot days when the fire was not lit inside, the hearth in the yard or a summer kitchen was used for cooking. or the "cellar" or "file" (so named because it was in the back of the house) was the storage space for food, tools, or small tools. The main food storage space was either the attic of the house or the cellar. The attic was used to store grain and smoke meat, and in the cellar were kept fruits, vegetables, pickled pots, and barrels of brandy or wine. The roof of the house was usually high and in four glasses of water. Multi-room houses appeared a little later, in the 19th and 20th centuries, and in this case, one of the rooms was kept for special days. In the "beautiful room", the "good house" or the "house before" guests were received at the big holidays, important family events were held. Here were placed the most precious furniture and decorative objects and here were kept the holiday clothes. Because it was used only occasionally, the beautiful room rarely had a heating system. Today there is so much talk about vernacular architecture because it is the condition for the sustainable development of rural communities. Vernacular architecture has the quality of being ecologically sustainable by adapting to the climate and relief of a particular place and by using the natural building materials available in that area [57]. Thus, vernacular architecture has a minimal impact on the natural environment, being sustainable from a social point of view, because it is based on the science of construction (local know-how) and local labor. This stimulates the feeling of belonging to people in that space, makes them feel that their place has something unique and that they share the specifics of the area. The brick was used sporadically in some areas of the country, for example in Saxon villages from southern Transylvania or Banat, and this happens under the influence of culture urban. Brick became a material favorite construction with the era of industrial. Clay or adobe was used in older times, being easy to find and by the process. They are still found today, mainly in the houses on the plain, where it has been kept construction system with clay reinforced with twigs woven, specific to Neolithic architecture [58]. The predominant decorations in most houses in the country have religious themes or depict flora, fauna, or anthropomorphic elements. The fabrics are adorned with decorative motifs with definite meanings, and the colors are usually bright.

2.10 Eţxperience of housing in Southern Netherlands, Belgium, and Germany

Many cities and villages in South-West Friesland are built on what is called terpen. It is an artificial dwelling mound found on the North European Plain that has been created to provide safe ground during storm surges, high tides, and sea or river

flooding [59]. There are incredibly many terpenes in Friesland, and now there are about 400 of them. The front door was in a narrow pediment and led to the utility part [60]. The hearth was still almost in the center of the room, but its transition was already outlined closer to the rear wall and the residential part's allocation. The stalls located behind the pillars were divided by low wicker partitions (see **Figure 19**).

Vernacular Houses from the Southern Netherlands and Belgium were of a different type. Although here and there were also rectangular semi-dugouts like the northern ones, all the same for these areas, starting from the Neolithic, round or oval-shaped huts, deepened 1.5–2 m into the ground, were characteristic. The walls were very low or completely absent, only the roof towered above the ground. It was built of long poles, had a cone shape, and was covered with straw and leaves [61]. Such a dugout is characterized by a roof structure with a DAKZUl - one pillar supporting the roof. There was an open hearth near the pillar. These houses bear a resemblance to the places of the ancient Celts in the British Isles. Apparently, in the Belgian and Dutch lands, the evolution of the house proceeded in the same way as in Britain - from a round hut through an oval to a rectangular single-chamber dwelling with an open hearth in the middle. An interesting type of dwelling, often found at the same time as round huts, in the eastern regions of Belgium: elongated buildings with an open canopy "VOORHALLE" over the main entrance from the narrow pediment. Two pillars supported the roof of the shed. The ridge beam of the gable roof was reinforced on several posts located on the centerline of the house. The area of homes varies from 20 to 84 m. Some of these dwellings have a three-chamber plan: for example, in North Limburg, dating back to the 1st century. n. e. the "VORHALLE" building was an elongated building made up of three rooms of the same size. Unfortunately, it is difficult to judge their purpose since not even the remains of the hearth have survived development of rural dwelling in the Netherlands and Belgium.

Stable house (HALLEHUIs) is one of the most ancient houses of the Netherlands, which also existed everywhere in Germany in the early Middle Ages, had only a narrow passage between two rows of pillars separating the stalls. With the development of agriculture, and especially when agriculture began to play an increasing role, the central longitudinal aisle expands and is used as a vast threshing floor. Such a transformation occurred because the high humidity of the air, frequent rains, and fogs made it challenging to thresh grain in an open room. Large houses, combining a residential part, a barn, and a barn under one roof, have been found since the 12th century, but they have become widespread since the 16th century. The residential part is divided into several rooms, more often into three: the central place is occupied by the main living room with a frontal fireplace and niche beds

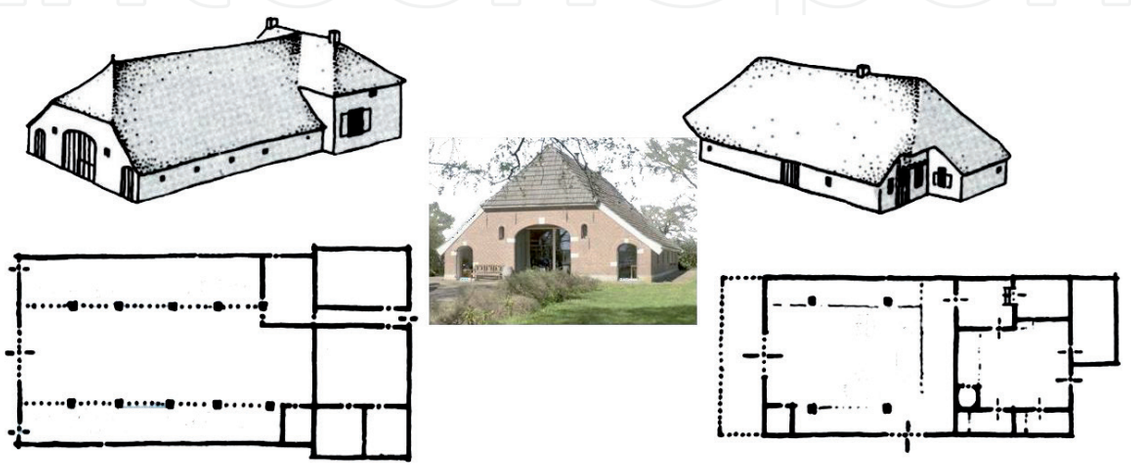


Figure 19.
The characteristic of the Southern Netherlands, Belgium, and Germany houses.

on both sides of it. To the left and right of this room are small bedrooms. One of the distinctive features of the stall house is also a very steep and high four- or two-pitched roof, which is apparently caused by a large amount of precipitation in the Netherlands. Such shelters were also convenient because an ample attic space was formed under them, where hay and grain supplies were stored. The roofs were covered with thatch, later with tiles. The walls of ancient houses were made up of vertical pillars connected by wattle fences, in the Middle Ages and up to the 19th century, frame walls predominated everywhere.

Frisian house (GULFHUIS) is, typical in the southern regions of the Netherlands and almost everywhere in Belgium, was often called Franconian or even Celtic by romantic ethnographers. Archeological materials indicate that its origin was somewhat different from the two previous types. It differed in the internal layout, the kind of connection between residential and utility premises, and design. The house's core was formed from a single chamber building with a central hearth, from which very early with a transverse partition at one end stalls were fenced off. In the early Middle Ages, another living room was fenced off behind the hearth on the other side. Frisian house (GULFHUIS) is characterized by a transverse division of the entire room, which is why in the Netherlands it is also often called "DVARSHHOIS". A small front or vestibule is usually separated by a light partition near the entrance in the main living room. The fireplace is located at the left or right of the wall from the front door.

2.11 Experience of housing in North Europa (Scandinavia)

The Longhouse is the traditional primary habitat in the Scandinavian region, dating back to the Iron Age, 2000 BC. This study examines the influence of climate on the conformation of habitats. Climate had a substantial impact on the conceptions of habitat form and internal space [62]. The climate's role in the conformation of the vernacular houses of the Scandinavian region was notable and can be observed clearly in the urban texture in the following:

- Roads, ways and moving arteries were east and west.
- The long facades of houses were designed to be north and south.
- The courtyard is essential in forming habitat units, combatting the adverse effects of high winds.

The walls of habitats in vast areas of Scandinavia define the edge between public spaces and private spaces and physically and perceptually explain the public roads and squares, the spaces in which communal life occurs (see **Figure 20**) [40].



Figure 20.
Environmental answer to vernacular habitat conformation from Scandinavia.

3. Future reading on a global sustainability in housing policy

Establishing a sustainable housing concept will point out the purpose, direction, and means for future housing planning, architectural design, improvement, and innovation of human settlements. It is essential to establish proper architectural and planning guidelines that conform to the laws of objective development. it required reforming and innovating to create a good and comfortable living environment for residents, benefit the people, and enable them to live and work in peace and contentment [63]. Housing is a crucial issue for any sustainable development. In recent years, under the strong organization and promotion of the government, excellent pilot projects, demonstration projects, and housing projects have emerged one after another, enabling people to obtain comfortable, convenient, safe, and sanitary housing. These pilots and demonstrations have already had a lot of good experience in implementing sustainable development strategies, such as energy-saving, land saving, water saving, new technology, new material application, etc. A sustainable framework for housing policy should focus on the future and have a strong contemporary focus, as otherwise it quickly becomes intangible in everyday inhabitants' lives. Therefore, the vision for a new framework for sustainable housing policy can be about methods by which sustainable solutions are made an attractive and advantageous alternative for all [64]. The intention is that sustainable solutions must be based on the city inhabitants' daily needs. For example, it is not required to cycle solely because it is environmentally friendly and healthy, but perhaps rather because it is easy, fast, cheap, and accessible. This principle can also be advantageously transferred to sustainable housing development. Everyday life must not become more complex with a sustainable change, then there is a risk that the broad popular support will be lacking. The shift in sustainable residential areas forbids an individual and collective project that can strongly support the city strategy in sustainable development. Housing strategies given the complexity of the challenges considered, there is a need for an overall housing strategy policy framework for how they are addressed, and the potentials exploited. By thinking about social-cultural conditions, environment, and economy together, the probability of being able to implement coherent solutions is improved. Sustainable housing strategy must be social - culturally viable, while at the same time considering climate adaptation, energy and resource efficiency, environment, architectural quality, and social security. In this way, the traditions and the environment can generate added value when they are considered together in holistic considerations [65]. A healthy environment should have indispensable intrinsic value. Humans and the entire natural environment are ecologically interdependent, and the persistence of this interdependence requires all aspects to establish a partnership, equal and balanced relationship. Urbanization based on residences' dreams can contribute to a more sustainable society by linking different urban functions in housing development strategies. Architectural design requirements are increased. To the standard of sustainable design, sustainable design should comprehensively consider the use of resources and energy, the use of healthy buildings and materials, land that is sensitive to ecology and society, and an esthetic that can inspire, affirm, and cultivate Sensitivity.

On the one hand, continuous design can significantly reduce the negative impact of humans on the natural environment, and on the other hand, it can improve the quality of life and improve living standards. Therefore, architectural design should pay more attention to ecological and environmental issues. Architecture has entered the era of "ecological architecture" (or "green building"). Sustainable development is proposed from the relationship between environmental pollution and human survival and growth. Still, sustainable development should also pay attention to the

relationship between economy, population, society, and resources. Coordinated development with the five aspects of the environment [66].

What is a sustainable house in the context of the climate change era?

Since the Rio Declaration, which is also the origin of the Environmental Summit, the term sustainable has become used to refer to economic activities that consider the global environment. Sustainable housing is a long-lived housing that is easy to live in and will be passed down to the next generation of children. Human beings will create homes that use natural clean energy such as solar heat and wind power, without using petroleum energy that causes global warming. In addition, because it is a residence that considers the cycle of tree growth and regeneration, it also leads to the effective use of recycled materials such as demolished old folk houses. In addition to making the house last longer, sustainable housing is also characterized by consideration for building a home that can reduce waste when dismantled and reuse building materials. Structure and performance with ruggedness and comfort. The critical point in the system is robustness. It is assumed that the suitable material is used in the right place and that a sturdy frame is assembled. In the case of a wooden house, not only is it a sturdy house with a structure, but it also has the advantage of being easy to remodel, such as extension and renovation, so you can continue to live without rebuilding. The interpretation of housing in construction, economy, society, and politics is also different. He summarized the meaning of housing: sheltered places, private Space, a product of location, a combination of buildings and neighborhood facilities, investment tools, a symbol of wealth and socio-economic status; also summarized. It has the characteristics of immovability, indivisibility, longevity, heterogeneity, expensiveness, investment products, and consumer products. Harsman and Quigley [67] also pointed out the characteristics of housing which is different from other commodities.

- Housing is a complex commodity, for It is difficult for both parties to trade effectively.

- Housing is fixed in space. Choosing accommodation means choosing a neighborhood environment.

- Housing is costly, so it is common to rent houses, mortgage loans are generally required to purchase homes, housing accounts for a large proportion of expenditure, and new house construction is a large part of the new investment every year.

- The life cycle of housing is extended, new housing only accounts for a small part of the housing service supply, and small changes in housing demand have a major impact on housing construction activities.

- Housing is a necessity. They emphasized that it is these characteristics that together determine the high transaction costs of the housing market.

In the construction idea, design, and design phase the framework for large parts of the building is laid out future, both in relation to the architectural and functional, but equally so in regard to the building's environmental, social and economic footprint. The personal impressions depend in height degree of what choices and opt-outs are made in these and later phases [68]. This release is aimed at to make the parties to the construction aware of the dilemmas often encountered and the considerations one must therefore do in connection with design and design of sustainable building.

4. Conclusion

Residential buildings are the most basic type of architecture, appearing the earliest in the history of world architecture, the most widespread, and the most significant number. Due to world vast territory, many ethnic groups, and a long history, the geographical and climatic conditions and lifestyles vary from place to place. Therefore, specific residential buildings' architectural styles and styles are relatively rare in the history of world vernacular architecture. The vernacular architecture had a rich and beautiful element symbol and a solid philosophical charm. It fully complies with the laws of nature and cleverly integrates the natural scene. That can be a solid basis to modern architecture which focuses on the pursuit of humanized characteristics, while traditional architectural culture advocates the harmony and unity of man and nature. Traditional architectural culture can provide connotative reference materials and broad thinking space for modern architectural design and further highlight the individual characteristics of architectural design and enhance the connotation of art and culture. The integration of traditional architectural culture into the field of modern architectural design can inherit national culture, highlight modern scientific features, demonstrate characteristic humanistic feelings, and reflect the new style of the development of the times. A sustainable house where people can live comfortably forever while being a friendly house to the global environment in future home building, the idea of sustainable housing will be strongly required. In sustainable housing, it is considered to create a house that is friendly to people and the earth everywhere, such as the structure, floor plan, equipment, and building materials used. Combining modern architectural design theories with traditional culture and creating a series of works that were in line with national conditions, adapted to nature, and recognized by the public, making modern architecture famous It is a model of new vernacular architecture. Citizen involvement is a central element in the housing development of the future and helps maintain the vision for human and diverse cities. It provides vibrant and sustainable housing strategies where everyone has a place and can have a say. It places different and new demands on both the individual, architects, and companies, but it also provides a wide range of opportunities for new collaborations across traditional structures. Housing strategy should include three aspects: first, it has changed in the size, density, and design of the population in different regions; second, it includes There are fundamental changes in the socio- economic structure; finally, it is the changes in people's behavior that need to be pointed out. Architects should pay more attention to the application of traditional housing systems, deepen the cognition and understanding of national culture, and enhance modern architecture's cultural connotation and artistic value. In modern architectural design, to seek the integration of cultural characteristics of different times, traditional cultural symbols will be summarized, refined, and refined. Local features will be added based on retaining essential values and then reshaped to achieve the inheritance and spread of traditional culture. At the same time, it can also improve the modern architectural design and highlight the connotation. Today, the worldwide urbanization process has reached a turning point. Its main manifestations are as follows: the population is highly concentrated in the cities, and the rural areas are highly concentrated. A good housing strategy should include a good connection with the local traditional housing system with a concordance of a metropolitan and global city, an attractive and inclusive opportunity, a green area, and a livable and resilient residential area, have a significant grade to regenerate, and reflect the fragrant history and cultural heritage of the local areas. That is the first step to sustainable housing.

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References

[1] Amjad Almusaed and Asaad Almssad (November 5th 2018). Introductory Chapter: Housing Policy Matters, Housing, Amjad Almusaed and Asaad Almssad, IntechOpen, DOI: 10.5772/intechopen.81622. Available from: https://www.intechopen.com/books/housing/introductory-chapter-housing-policy-matters

[2] Trovato, M.R. An Axiology of Residual Green Urban Areas. Environments 2021, 8, 53. https://doi.org/10.3390/environments8060053

[3] Amjad Almusaed, Asaad Almssad, Asaad Alasadi, Analytical interpretation of energy efficiency concepts in the housing design process from hot climate, Journal of Building Engineering, Volume 21, January 2019, Pages 254-266, https://doi.org/10.1016/j.jobe.2018.10.026

[4] Raad Z.Homod, Almssad, A., Almusaed, A, Et al (2021), Effect of different building envelope materials on thermal comfort and air-conditioning energy savings: A case study in Basra city, Iraq, Elsevier Journal of Energy Storage,volume 34, February 2021, 101975, https://doi.org/10.1016/j.est.2020.101975

[5] Thomas Hall & Sonja VidenThe Million Homes Programme: a review of the great Swedish planning project, Planning Perspectives, 20:3, 301-328, (2005). http://doi.org/10.1080/02665430500130233

[6] Jian Z., Zhen-Y. Z., Green building research–current status and future agenda: A review, Renewable and Sustainable Energy Reviews, Volume 30, February 2014, Pages 271-281, https://doi.org/10.1016/j.rser.2013.10.021

[7] Cascone, S.M.; Cascone, S.; Vitale, M. Building Insulating Materials from Agricultural By-Products: A Review. In Sustainability in Energy and Buildings. Smart Innovation, Systems and Technologies; Littlewood, J., Howlett, R., Capozzoli, A., Jain, L., Eds.; Springer: Singapore, 2020; Volume 163

[8] Amjad Almusaed, et al., Biophilic architecture, the concept of healthy sustainable architecture, PLEA2006 - The 23rd Conference on Passive and Low Energy Architecture, Geneva, Switzerland, 6-8 September 2006.

[9] Muzaffer U., M. Joseph S., Eunju W. Hyelin K.,Progress in Tourism Management; Quality of life (QOL) and well-being research in tourism, Tourism Management, Volume 53, April 2016, Pages 244-261, https://doi.org/10.1016/j.tourman.2015.07.013

[10] Amjad Almusaed and Asaad Almssad (December 13th 2018). Introductory Chapter: Overview of Sustainable Cities, Theory and Practices, Sustainable Cities - Authenticity, Ambition and Dream, Amjad Almusaed and Asaad Almssad, IntechOpen, DOI: 10.5772/intechopen.82632. Available from: https://www.intechopen.com/books/sustainable-cities-authenticity-ambition-and-dream/introductory-chapter-overview-of-sustainable-cities-theory-and-practices

[11] Kevin D., Menelaos G., Architecture and rural planning: 'Claiming the vernacular, Volume 41, November 2014, Pages 334-343, Land Use Policy, https://doi.org/10.1016/j.landusepol.2014.06.013

[12] Senanayake, S.G.J.N.,. Indigenous knowledge as a key to sustainable development. Journal of Agricultural Sciences – Sri Lanka, 2(1), pp.87-94. 2006. DOI: http://doi.org/10.4038/jas.v2i1.8117

[13] Almusaed A., Almssad, A. & Alasadi, A. (2019). Analytical

interpretation of energy efficiency concepts in the housing design, Journal of Building Engineering 21, ss. ISSN: 254-266, 2352-7102/ Published by Elsevier Ltd. https://doi.org/10.1016/j.jobe.2018.10.026.

[14] Almusaed, A.; Almssad, A.; Homod, R.Z.; Yitmen, I. Environmental Profile on Building Material Passports for Hot Climates. Sustainability 2020, 12, 3720. https://doi.org/10.3390/su12093720

[15] Bogdan V. C., Alexandru L. P., Traditional Architecture in Romanian Philately (IV): the Households from Ieud, Jurilovca, Mastacăn, Moișeni and Năruja, Asian Journal of Education and Social Studies, 17(1): 29- 38, 2021; Article no.AJESS.67445, http://doi.org/10.9734/AJESS/2021/v17i130412

[16] Christian Illies, Nicholas Ra, y Philosophy of Architecture, Philosophy of Technology and Engineering Sciences, Handbook of the Philosophy of Science, 2009, Pages 1199-1256, https://doi.org/10.1016/B978-0- 444-51667-1.50047-1

[17] J.Safrin R. D., C. Ezhil M. Sustainable quotient of traditional houses - a panoramic view of agraharams in ayanavaram, international journal of engineering sciences & research technology (IJESRT), Dulcie * et al., 7(3): March, 2018, http://doi.org/10.5281/zenodo.1189052.

[18] Mohan Pant & Shuji Funo The Grid and Modular Measures in The Town Planning of Mohenjodaro and Kathmandu Valley, Journal of Asian Architecture and Building Engineering, 4:1, 51-59, (2005) https://doi.org/10.3130/jaabe.4.51

[19] Thomas P. Leppard, Social Complexity and Social Inequality in the Prehistoric Mediterranean, Current Anthropology, 2019, (3)Volume 60, Number 3, https://doi.org/10.1086/703174

[20] De Feo, G.; Antoniou, G.; Fardin, H.F.; El-Gohary, F.; Zheng, X.Y.; Reklaityte, I.; Butler, D.; Yannopoulos, S.; Angelakis, A.N. The Historical Development of Sewers Worldwide. Sustainability 2014, 6, 3936-3974. https://doi.org/10.3390/su6063936

[21] Robert S. Homsher, Mud Bricks and the Process of Construction in the Middle Bronze Age Southern Levant, Bulletin of the American Schools of Oriental Research, No. 368 (November 2012), pp. 1-27, The University of Chicago Press, https://doi.org/10.5615/bullamerschoorie.368.0001

[22] Ali, M.M.; Al-Kodmany, K. Tall Buildings and Urban Habitat of the 21st Century: A Global Perspective. Buildings 2012, 2, 384-423. https://doi.org/10.3390/buildings2040384

[23] Hyun Bang Shin, Urban conservation and revalorisation of dilapidated historic quarters: The case of Nanluoguxiang in Beijing, Cities, Volume 27, Supplement 1, June 2010, Pages S43-S54, https://doi.org/10.1016/j.cities.2010.03.006

[24] Shaoqing G. et al. Climate responsive strategies of traditional dwellings located in an ancient village in hot summer and cold winter region of China. Building and Environment, Volume 86, April 2015, Pages 151- 165, https://doi.org/10.1016/j.buildenv.2014.12.003

[25] Lowe, K.D. Heaven and Earth—Sustaining Elements in Hakka Tulou. Sustainability 2012, 4, 2795-2802. https://doi.org/10.3390/su4112795

[26] Almusaed, A., Yitmen, I, Almssad, A., & Homod, R. Z.(2020). Environmental profile on building material passports for hot climates. Sustainability (Switzerland), 12(9). https://doi.org/10.3390/su12093720

[27] Donia Zhang, Classical Courtyard Houses of Beijing: Architecture as

Cultural Artifact, Space and Communication 2015; 1(1): 47-68, https://doi.org/10.15340/2148172511881

[28] Low K., Ang S., Confucian Leadership and Corporate Social Responsibility (CSR) the Way Forward, Asian Journal of Business Research, Volume 2 Number 1 2012, https://doi.org/10.14707/ajbr.120006

[29] Amjad Almusaed, Asaad Almssad, Building materials in eco-energy houses from Iraq and Iran, Case Studies in Construction Materials, Volume 2, June 2015, Pages 42-54, https://doi.org/10.1016/j.cscm.2015.02.001

[30] Ji Youn Kim, Cultural entrepreneurs and urban regeneration in Itaewon, Seoul, Cities, Volume 56, July 2016, Pages 132-140, https://doi.org/10.1016/j.cities.2015.11.021

[31] Katarina Rus, Vojko Kilar David Koren, Resilience assessment of complex urban systems to natural disasters: A new literature review, International Journal of Disaster Risk Reduction, Volume 31, October 2018, Pages 311-330, https://doi.org/10.1016/j.ijdrr.2018.05.015

[32] Jiaran Zhanga,Yingrui Chib, Mengdi Shi, On the Transition from Ming Dynasty Ceramic Courtyard to North China Residence Take the Ming Dynasty Pottery Courtyard of Henan Museum as an Example, International Journal of Frontiers in Sociology, Vol. 3, Issue 4: 93-98, https://doi.org/10.25236/IJFS.2021.030420.

[33] Zhang Fengjie, The Architectural Typology Analysis of Han Traditional Courtyard in Northeast China, International Journal of Structural and Civil Engineering Research Vol. 10, No. 1, February 2021, http//doi.org/10.18178/ijscer.10.1.9-16

[34] Akadiri, P.O.; Chinyio, E.A.; Olomolaiye, P.O. Design of A Sustainable Building: A Conceptual Framework for Implementing Sustainability in the Building Sector. Buildings 2012, 2, 126-152. https://doi.org/10.3390/buildings2020126

[35] Ken Tadashi Oshima, Rediscovering Japanese Urban Space in a World Context, Volume: 42 issue: 3, page(s): 623-633, https://doi.org/10.1177/0096144216635165

[36] Gozde Çakır, the effects of natural environmental data in the traditional japanese house design, International Journal of Advanced Research 6(7):361-371, http://dx.doi.org/10.21474/IJAR01/7370

[37] Amjad Almusaed and Asaad Almssad (December 22nd 2019). City Phenomenon between Urban Structure and Composition, Sustainability in Urban Planning and Design, Amjad Almusaed, Asaad Almssad and Linh Truong-Hong, IntechOpen, DOI: 10.5772/intechopen.90443. Available from: https://www.intechopen.com/books/sustainability-in-urban-planning-and-design/city-phenomenon- between-urban-structure-and-composition

[38] Yan Liu, A full moon in another land: The Moon Bridge in the Japanese garden of the Huntington Library, Frontiers of Architectural Research Volume 9, Issue 3, September 2020, Pages 556-567, https://doi.org/10.1016/j.foar.2020.02.004

[39] Nobuyuki MIYAZAKI, A study on the theory for floor planning of the central living-room type house in modern ages of japan; In the case of the pamphlet presented by the union for the improvement of living conditions in 1921, Journal of Architecture and Planning (Transactions of AIJ), Volume 75 (2010) Issue 649, https://doi.org/10.3130/aija.75.551

[40] Almusaed, A., Almssad, A. (2015). Environmental reply to vernacular

habitat conformation from vast areas of Scandinavia. Renewable & Sustainable Energy Reviews Journal, Elsevier, ISSN: 1364-0321, Volume 48, ss. 825-834, August 2015. https://doi.org/10.1016/j.rser.2015.04.013

[41] Shigeo Kawamoto, On the origin of the shinden-zukuri residence, Journal of Architecture and Planning (Transactions of AIJ), 2016 Volume 81 Issue 729 Pages 2497-2506, https://doi.org/10.3130/aija.81.2497

[42] Nuri Seo, Yunsub Lee, Yeheun Jeong and Youngsoo Jung, Evaluation Framework for Korean Traditional Wooden Building (Hanok) through Analyzing Historical Data, Pages 614-621 (2018 Proceedings of the 35th ISARC, Berlin, Germany, https://doi.org/10.22260/ISARC2018/0084

[43] Kim Bok-rae, Past, Present and Future of Hallyu (Korean Wave), American International Journal of Contemporary Research Vol. 5, No. 5; October 2015.

[44] Yitmen, Ibrahim, Amjad Almusaed, et al (2021), ANP Model for Evaluating the Performance of Adaptive Façade Systems in Complex Commercial Buildings, Engineering, Construction and Architectural Management Journal, https://doi.org/10.1108/ECAM-07-2020-0559

[45] Amjad Almusaed and Asaad Almssad (March 14th, 2012). Passive and Low Energy Housing by Optimization, Effective Thermal Insulation - The Operative Factor of a Passive Building Model, Amjad Almusaed, IntechOpen, DOI: 10.5772/36922. Available from: https://www.intechopen.com/books/effective- thermal-insulation-the-operative-factor-of-a-passive-building-model/passive-and-low-energy-housing-concept-

[46] Almusaed, A. Biophilic and Bioclimatic architecture, Analytical Therapy for the Next Generation of Passive Sustainable Architecture (2011), Springer-Verlag London Limited, p 406, London, UK. https://www.springer.com/gp/book/9781849965330

[47] Mofidi, S. Majid, R. Vakilinezhad, and Mehdizadeh Mehdizadeh. 2013. "Shanashil: A Sustainable Element to Balance Light, View and Thermal Comfort." The International Journal of Environmental Sustainability 8 (4): 101-110., https://doi.org/10.18848/2325-1077/CGP/v08i04/55066

[48] Amjad Almusaed and Asaad Almssad (March 14th 2012). Improvement of Thermal Insulation by Environmental Means, Effective Thermal Insulation - The Operative Factor of a Passive Building Model, Amjad Almusaed, IntechOpen, DOI: 10.5772/35744. Available from: https://www.intechopen.com/books/effective-thermal-insulation-the-operative-factor-of-a-passive-building-model/improvement-of-thermal-insulation-by-environmental-means-

[49] Hossein Sarhaddi-Dadian, Zohre Oveisi-Keikha, Vahid Purzarghan, Introducing Troglodyte Architecture at Chabahar City in South-east of Iran, International Journal of Archaeology. Vol. 5, No. 1, 2017, pp. 1-5. doi: 10.11648/j.ija.20170501.11

[50] Nimet Öztank, An Investigation of Traditional Turkish Wooden Houses, Journal of Asian Architecture and Building Engineering, 9:2, 267-274(2010), DOI: 10.3130/jaabe.9.267

[51] Paavo Monkkonen, The Housing Transition in Mexico: Expanding Access to Housing Finance, SAGE journals, Volume: 47 issue: 5, page(s): 672-695, https://doi.org/10.1177/1078087411400381

[52] Amjad Almusaed (September 6th 2017). Introductory Chapter: Overview

on Grass Topic, Grasses - Benefits, Diversities and Functional Roles, Amjad Almusaed and Sammera Mohamed Salih Al-Samaraee, IntechOpen, DOI: 10.5772/intechopen.70407. Available from: https://www.intechopen.com/books/grasses-benefits- diversities-and-functional-roles/introductory-chapter-overview-on-grass-topic

[53] Amjad Almusaed (September 19th 2018). Introductory Chapter: A General Reading Process on Landscape Architecture, Landscape Architecture - The Sense of Places, Models and Applications, Amjad Almusaed, IntechOpen, DOI: 10.5772/intechopen.77971. Available from:https://www.intechopen.com/books/landscape-architecture-the-sense-of-places-models-and-applications/introductory-chapter-a-general-reading-process-on-landscape-architecture

[54] Moghadam, Valentine M. "democratization and women's political leadership in north Africa." Journal of International Affairs, vol. 68, no. 1, 2014, pp. 59-78. JSTOR, www.jstor.org/stable/24461706. Accessed 8 July 2021.

[55] Richard Stren, Urban Service Delivery in Africa and the Role of International Assistance, Development Policy Review, 2014, 32 (S1): s19–s37, https://doi.org/10.1111/dpr.12067

[56] Velika Ivkovska, Aiming Towards the Sky: The Vernacular „skyscrapers" of the South-West Balkans, ISVS e-journal, Vol. 6, no.3, Special Issue on Ottoman Vernacular, June, 2019, DOI: 10.5194/isprs-archives- XLIV-M-1-2020-1005-2020.

[57] Amjad Almusaed and Asaad Almssad (July 18th 2018). Introductory Chapter: Overview of a Competent Sustainable Building, Sustainable Buildings - Interaction Between a Holistic Conceptual Act and Materials Properties, Amjad Almusaed and Asaad Almssad, IntechOpen, DOI: 10.5772/intechopen.77176. Available from: https://www.intechopen.com/books/sustainable-buildings-interaction-between-a-holistic-conceptual- act-and-materials-properties/introductory-chapter-overview-of-a-competent-sustainable-building

[58] E. B. Banning, The Neolithic Period: Triumphs of Architecture, Agriculture, and Art, A journal of the American Schools of Oriental Research, Volume 61, Number 4, December 1998, https://doi.org/10.2307/3210656

[59] J.Bazelmans D. Meiere A. Nieuwho T. Spek P. Vos, Understanding the cultural historical value of the Wadden Sea region. The co-evolution of environment and society in the Wadden Sea area in the Holocene up until early modern times (11,700 BC–1800 AD): An outline, Ocean & Coastal Management, Volume 68, November 2012, Pages 114-126, https://doi.org/10.1016/j.ocecoaman.2012.05.014

[60] Appolloni L, D'Alessandro D. Housing Spaces in Nine European Countries: A Comparison of Dimensional Requirements. International Journal of Environmental Research and Public Health. 2021; 18(8):4278. https://doi.org/10.3390/ijerph18084278

[61] Tawayha FA, Braganca L, Mateus R. Contribution of the Vernacular Architecture to the Sustainability: A Comparative Study between the Contemporary Areas and the Old Quarter of a Mediterranean City. Sustainability. 2019; 11(3):896. https://doi.org/10.3390/su11030896

[62] Amjad Almusaed and Asaad Almssad (July 16th 2020). Urban Social Sustainability - Case Study; Gellerupparken–Denmark, Sustainability in Urban Planning and Design, Amjad Almusaed, Asaad Almssad and Linh Truong-Hong,

IntechOpen, DOI: 10.5772/intechopen.93124. Available from: https://www.intechopen.com/books/sustainability-in-urban-planning-and-design/urban-social- sustainability-case-study-gellerupparken-denmark

[63] Ibrahim, I.A. Sustainable housing development: role and significance of satisfaction aspect. City Territ Archit 7, 21 (2020). https://doi.org/10.1186/s40410-020-00130-x

[64] Sipos N, Pap N, Gonda T, Jarjabka Á. Feasibility and Sustainability Challenges of the Süleyman's Türbe Cultural-Tourism Centre Project in Szigetvár, Hungary. Sustainability. 2021; 13(10):5337. https://doi.org/10.3390/su13105337

[65] Silvia Mete, Jin Xue, Integrating environmental sustainability and social justice in housing development: two contrasting scenarios, Progress in Planning, Available online 10 July 2020, 100504, https://doi.org/10.1016/j.progress.2020.100504

[66] Matheus F.A.Goosen, Environmental management and sustainable development, Procedia Engineering, Volume 33, 2012, Pages 6-13, https://doi.org/10.1016/j.proeng.2012.01.1171

[67] Bjoern Harsman, John M Quigley, Housing Markets and Housing Institutions: An International Comparison, 1991, Springer

[68] Almusaed A., Almssad, A., et al, Coherent Investigation on a Smart Kinetic Wooden Façade Based on Material Passport Concepts and Environmental Profile Inquiry, Published by MDPI Energy in Construction and Building Materials (Switzerland). https://doi.org/10.3390/ma14143771